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The health literacy dyad: the contribution of future GPs in England

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ABSTRACT

Background: Health literacy studies have primarily focused on the cognitive and social skills of individuals needed to gain access to, understand, and use health information. This area of study is undergoing a paradigm shift with increased attention being paid to the skills of practitioners and an examination of their contribution to the link between literacy and health outcomes. The aim of this study was to describe the health literacy related competencies of General Practice (GP) trainees who will soon be responsible for the clinical encounter.

Methods: A cross-sectional survey of a convenience sample of 206 GP trainees was conducted online. Univariate and bivariate analysis methods were used to describe GP trainees' health literacy related competencies.

Results: GP trainees overestimated the numeracy and literacy levels of the English population and did not regard the improvement of patient health literacy as a GP responsibility. GP trainees rated their general communication skills highly but the skills that are important for patients in health decision-making such as coaching skills, explaining risk and using visual aids to clarify were rated low.

Conclusion: This study demonstrates that health literacy is insufficiently addressed in the undergraduate and postgraduate medical education of GPs to enable them to fulfil the core competence which is part of building an effective partnership with patients.

Introduction

The field of health literacy, commonly defined as 'the degree to which people are able to access, understand, appraise, and communicate information' [1] has focused on the skills and abilities of the lay public but also includes attention to the skills and abilities of health care professionals (HCPs). It is now well established that low health literacy is associated with increased hospitalisations and use of emergency care services, lower mammography screening and influenza immunisations, lower skills in interpreting labels and health messages, lower overall health status and higher mortality amongst older people (OR: 1.3–1.8) [2,3]. It is recognised that there has been a missing variable in the analysis of the pathways by which health literacy is associated with poor health outcomes: the contribution of the provider/system and the demands of the patient encounter has not been adequately considered [4].

A report from the UK Royal College of General Practitioners (RCGP) [5] called for GPs to have a central role in improving health literacy through tailoring clear accessible information, not only to clinical need but also to patients' health literacy skills, and helping to develop health systems and environments that are easier to navigate. Yet most studies of health literacy as a determinant of patient outcomes have not considered the role of HCPs [6]. Several cross-sectional and qualitative studies on HCPs' ability to identify patients with poor literacy skills [7,8] have shown that HCPs underestimate patients' health literacy [9,10]. US studies of medical education have

concluded that health literacy practices are not sufficiently or systematically implemented in HCPs' education [11,12].

The aim of this study was to investigate whether, and in what ways GP trainees in England are prepared to mitigate the effects of low literacy on health outcomes. This study investigated the competency of GP trainees in England in relation to the domains currently used in the medical education of GPs in England [13] and to the health literacy competence framework for HCPs developed in the USA [14].

Methods

Study design and participants

This study was conducted as an online cross-sectional survey of GP trainees in one area of England. All local GP trainees (approximately 800) were approached. Additionally, 40 GP trainees from another sector were approached to participate in a pilot; data from those who responded were included in the final analysis. Respondents were sent an invitation email with the electronic survey attached and given three weeks to complete the questionnaire. Two reminders were sent: one three weeks and another six weeks after the start of the data collection. Data were collected between January and March 2015. Ethical approval was granted by London South Bank University Ethics Committee in September 2014 (UREC 1440).

Instruments

The development of the survey questionnaire arose from rigorous mapping of interviews with decision-makers in medical education [15]. Following a framework analysis of this data, categories identified were compared to the 62 health literacy competencies described by Coleman and colleagues [14]. In a second stage, a review of UK publicly available curriculum documents was used to identify any further health literacy competencies. Finally, a literature review of studies [15] that assessed health literacy competencies was compared to the health literacy competence framework to investigate the methodological properties of instruments that assess health literacy related knowledge, attitudes and skills. This helped identify items that were more frequently assessed by researchers and the scoring or answer categories used. The questions were tested with eight General Practitioners, statisticians and public health trainers.

Outcome variables assessed health literacy related knowledge, attitudes and self-rated skills as well as the role of the curriculum in developing these competencies. Knowledge questions have been derived from the health literacy competency framework [14], which considers knowledge an important component of competency; they assess understanding of patient numeracy and literacy, 'red flags' and consequences of low health literacy, and techniques for patient communication including plain language and checking for understanding. Attitudes of GP trainees were defined in relation to the importance of health information for the quality of health care, judgements about those with low health literacy, and the extent to which decision-making and navigation of the health care system is a shared responsibility. Self-rated skills addressed GP trainees' general and advanced communication skills.

Analysis

Univariate descriptive analyses were performed for all outcome and independent variables. Given the concentration of responses to attitudes and skills questions to either extremes in this study and after careful consideration of the literature, a decision was made to dichotomise attitudes and skills items. This is a widely used approach in the analysis of Likert type Scales [16]. For knowledge items which had been formulated as multiple choice questions, responses were dichotomised as correct-incorrect. Attitudes were dichotomised into agree and disagree, and reported as negative versus positive attitudes. Skills were dichotomised into low versus high self-rated skills. As a result of this data manipulation, the three outcome variables were continuous numerical variables that represent: percentage of correct knowledge items, percentage of good or excellent skills, and percentage of positive attitudes.

Bivariate analyses assessed the association between knowledge, attitudes and skills and socio-demographic variables. For these analyses, summary scores of these scales were computed. Depending on the metric properties of the scales, different tests were used: student-t tests for comparison of two means, ANOVA for comparison of more than two means, Chi-Square tests for the association between two categorical variables, and Pearson correlation analysis for the association between continuous variables. All statistical tests were two-sided.

Table 1 about here

Results

Sample characteristics

800 GP trainees in one area in England were invited to participate in the online survey. A total of 206 questionnaires were completed, resulting in a response rate of 25%. Table 1 shows the demographic details, training location and year of study of GP trainees. The majority of respondents were female (79.1%), of white ethnic background (57.3%) and had completed their undergraduate studies at a UK university (Table 1).

Knowledge

Only 2.2% (n = 4) of GP trainees answered all knowledge questions correctly, with 61.2% of them (n = 114) answering over 70% of the questions correctly. A high proportion of GP trainees (74.7%) overestimated population numeracy levels and, almost a fifth were unable to provide any estimates of numeracy levels of the patients they saw on a daily basis (Table 2). GP trainees also overestimated population literacy levels and the recommended reading level for written health information. 75.8% were able to recognise a 'red flag' for low health literacy and 89.8% correctly identified the consequences of low health literacy. The majority of GP trainees appeared knowledgeable about spoken communication skills and correctly identified examples of plain language (80.1%) and the method of checking for patients' understanding by having the patient repeat back the information in their own words (96.7%).

Table 2 about here

Attitudes

GP trainees did not display discriminatory views about patients with low health literacy (Table 3), although almost a third (30.4%) thought that higher education would be an indicator of good health literacy skills in patients. Although almost all GP trainees agreed that patients' understanding of health information or health care is a patient right

(92.2%) and could contribute to improving the quality of health care delivery, only a third (30.2%) agreed that this responsibility was shared between patients and health care providers. Similarly, while a large proportion of GP trainees were sympathetic towards patients facing complex health literacy environments with difficult language (75%) and physical navigation (94.3%), only a third of GP trainees agreed or strongly agreed that patients who have difficulty reading might find it hard to ask questions and only 12.5% agreed that the responsibility of getting to the appointment does not lie with the patient alone.

Table 3 about here

Skills

Most GP trainees appeared to be confident of their general communication skills but were less confident when rating their more advanced oral or written communication skills (Table 4). Although a majority of GP trainees were able to identify ways to confirm patient understanding (teach-back), only 51.1% rated their skills as good or excellent in this area. Most rated their skill as good or excellent for speaking slowly and clearly (85.2%), using plain language (81.5%) and encouraging patients to ask questions through an open approach (85.6%). GP trainees were less confident in relation to more advanced skills that involve increased interaction with patients such as negotiating a mutual agenda (46%), eliciting a full set of concerns (55.5%), and using an interpreter (52.2%). Their ability to engage their patients through mentoring and coaching skills was rated low, with only 35.4% of GP trainees rating their skills as good or excellent. Less than half of GP trainees rated themselves as having good or excellent skills in using visual aids such as drawing pictures to make analogies (52.1%) or explaining risk through illustrations (34.6%). Only 51.6% of GP trainees were confident in selecting appropriate written materials and 39.1% in selecting culturally appropriate visual aids for patient leaflets.

Table 4 about here

Analysis of differences

More of the white respondents had positive attitudes towards people with low health literacy (71.1%) compared to Asian/Asian British (64.7%) or other ethnic groups (67.8%). GP trainees who had graduated from a UK university outside the studied area had a higher proportion of positive attitudes (71.6%) compared to GP trainees that had graduated from a university in the studied area (67.4%) or non-UK graduates (55.5%) (Table 5). There were no differences in GP trainees' competencies (knowledge, attitudes or skills) based on their stage of training.

Table 5 about here

There was evidence that a significantly higher proportion of GP trainees self-rated their skills as good or excellent amongst those more familiar with the health literacy concept ($p < 0.001$); as familiarity increased so did the proportion with skills self-rated as good or excellent. Male GP trainees were more confident than female GP trainees when rating their skills (62.7% vs. 55.0%). Asian/Asian British reported more confidence in their skills than white or other ethnic groups (60.9% vs. 55.1%).

Discussion

This study is the first assessment of health literacy-related knowledge, attitudes and skills in England. Sociodemographic characteristics of the sample have been checked with Health Education England and were considered representative of the current distribution of GP trainees in the studied area. It shows that GP trainees have insufficient knowledge and skills to address health literacy the challenges of which are considerable where the health service is primary care-led as in England.

The survey instrument was developed from an exhaustive review of the international literature and discussions with stakeholders in medical education, making the instrument highly relevant and applicable to the NHS. Face and content validity has been ensured by incorporating suggestions made by GPs and GP trainers interviewed in a preceding pilot survey. A limitation of the study is that the survey could be subject to self-selection bias in that only interested GP trainees completed the questionnaire. As a result, findings of this study might overestimate (but are unlikely to underestimate) GP trainees' health literacy-related knowledge, attitudes and skills. Possible response bias was reduced through ensuring anonymity of the questionnaire and by careful wording of questions [17]. Acquiesence bias was reduced by alternating attitude related statements that required disagreement with statements that required agreement [18]. Direct observation of skills in clinical practice or during examinations of communication skills [10] was considered but was deemed unfeasible, particularly because of ethics considerations. It might have offered a more accurate picture of a reported ability to perform certain tasks but this was not possible when a large number of respondents was desired.

This study confirms previous research showing that there is limited knowledge of health literacy amongst HCPs and overestimation of the level of population literacy and numeracy skills [19–22]. In common with other studies [23,24], the GP trainees in this study could recognise warning signs or 'red flags' such as repeatedly missed appointments but were less clear about what might be population indicators of low health literacy.

Nearly a quarter of participants in Jukkala et al.'s study believed that health literacy level can be determined based on a person's ethnicity, culture, age or socioeconomic status [19]. Most GP trainees in this study (85.1%) understood that ethnicity was not necessarily an indicator of low health literacy and 77.3% believed that socio-economic status did not predict low health literacy. At the same time, almost a third of GP trainees (30.4%) in the present study compared to 7.4% participants in Jukkala et al.'s study (2009) [19] thought that higher education was a marker of good health literacy skills. These findings suggest that GPs should apply a 'universal precautions' approach to communication (that is, communicate clearly without jargon for all patients) and not only when they presume health literacy to be low.

Previous research has found that dentists who are immigrants or from minority ethnic groups used more communication techniques than their peers [25]. In our study, in contrast, we found that GP trainees who had graduated from a UK university had more positive attitudes than those who had graduated from a non-UK university. It is possible that cultural norms and different expectations in terms of patient-provider relationships lead to more negative attitudes towards those with low health literacy.

Previous studies of health care professionals' self– reported use of communication techniques showed high self-reported frequency of plain language use among dentists (90.7%) [25], emergency doctors (92.2%) [26], and paediatricians (99%) [27]. Our study showed a high percentage of GP trainees rating their plain language skills highly (81,5%). Half of GP trainees' (51.1%) reported confidence in using teach back techniques to check patient understanding compared to 25% of dentists [25] or 23% of paediatricians [27]. Confidence in using pictures to improve comprehension was low; in other studies, only 42.8% [25] or 35.1% [26] of participants used this communication technique. Literature shows that patients rated physicians' communication lower than physicians self-rated themselves [28]. Therefore, these findings may, in fact, overestimate GP trainees' confidence in their health literacy-related skills.

Whilst the medical curriculum emphasises good communication skills in order to share complex information which can include the nature of a diagnosis, the risks and benefits of different treatments, and how to take medications in a safe and effective way [13], it is clear that GP trainees do not feel competent in using a range of skills with patients of low health literacy.

Conclusion

The importance of this study is that it has identified gaps in relation to GP trainees' health literacy-related knowledge, attitudes and skills. As a result of this study, the RCGP core curriculum statement now includes reference to the expectation that GPs should promote health literacy, and discussions are taking place about including health literacy- specific training in the undergraduate and postgraduate medical curricula. As part of the core competence to 'establish an effective partnership with patients', GPs are expected to 'enhance the health literacy in patients from a range of backgrounds, by providing tailored information, facilitating communication and checking understanding as appropriate [13].' Education and training of GPs and other HCPs in communication skills will thus need to develop specific skills in relation to working with those with low health literacy. The instrument that was developed for the purpose of this study could be used for a routine periodic assessment of health literacy-related knowledge, attitudes and skills.

This study suggests that health literacy is not adequately addressed in the medical education of GPs. Limited literacy skills amongst adults in the UK are well-documented as are the links between the literacy skills of patients and health outcomes. Health care professionals are in a position to mitigate or contribute to these untoward health outcomes and future GPs need the right competences that enable them to support patients in making health decisions. Such competences need to be included in the medical education curriculum by establishing specific learning objectives and appropriate assessment methods, as simply relying on the experience gained through clinical placements may be insufficient to address health literacy-related competences in a comprehensive way.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

[1] Kwan B, Frankish J and Rootman I. The development and validation of measures of "Health literacy" in different populations. Vancouver: University of British Columbia, 2006. [cited 2013 Jan 16]. Available from: http://blogs.ubc.
ca/frankish/files/2010/12/HLit-final-report-2006-11-24.
pdf
[2] DeWalt DA, Berkman ND, Sheridan S, et al. Literacy and health outcomes. J Gen Intern Med. 2004;19:1228–1239.
[3] Berkman ND, Sheridan SL, Donahue KE, et al. Low health literacy and health outcomes: an updated systematic review. Ann Intern Med. 2011;155:97–107.
[4] Roter DL. Oral literacy demand of health care communication: challenges and solutions. Nurs Outlook. 2011;59:79–84.
[5] Rowlands G, Protheroe J, Price H et al Report from an RCGP led health literacy workshop. 2014. [cited 2015 Mar 23]; Available from:
http://www.rcgp.org.uk/news/2014/june/~/media/Files/Policy/RCGP-Health-Literacy-2014.ashx
[6] Paasche-Orlow MK, Wolf MS. The causal pathways linking health literacy to health outcomes. Am J Health Behav. 2007;31(Suppl. 1):19–26.
[7] Kelly PA, Haidet P. Physician overestimation of patient literacy: A potential source of health care disparities. Patient Educ Couns. 2007;66:119–122.
[8] Rogers ES, Wallace LS, Weiss BD. Misperceptions of medical understanding in low-literacy patients: implications for cancer prevention. Cancer Control. 2006;13:225–229.
[9] Knight GD. An evaluation of the health literacy knowledge and experience of registered nurses in Georgia [PhD thesis]. Auburn University; 2011.
[10] Green JA, Gonzaga AM, Cohen ED, et al. Addressing health literacy through clear health communication: a training program for internal medicine residents. Patient Educ Couns. 2014;95:76–82.
[11] Coleman C. Teaching health care professionals about health literacy: a review of the literature. Nurs Outlook. 2011;59:70–78.
[12] Ali NK. Are we training residents to communicate with low health literacy patients? J Community Hosp Intern Med Perspect. 2013;2(4). doi:10.3402/jchimp.v2i4.19238
[13] Royal College of General Practitioners. Being a General Practitioner. 2016. [cited 2016 Feb 5]; Available from:
http://www.rcgp.org.uk/training-exams/gp-curriculumoverview/~/media/Files/GP-training-and-exams/Curriculum-2012/RCGP-Curriculum-1-Being-a-GP.
ashx
[14] Coleman CA, Hudson S, Maine LL. Health literacy practices and educational competencies for health professionals: a consensus study. J Health Commun. 2013;18(Suppl 1):82–102.
[15] Groene OR. Health literacy in the Undergraduate and Postgraduate Medical Education of General Practitioners [Doctoral thesis]. London: London South Bank University; 2016.
[16] Jenkinson C, Coulter A, Bruster S. The Picker Patient Experience Questionnaire: development and validation using data from in-patient surveys in five countries. Int J Qual Health Care. 2002;14:353–358.
[17] Krosnick JA. A review: question wording and reports of survey results: the case of Louis Harris and associates and aetna life and casualty. Public Opin Q. 1989;53:107–

113.
[18] Hinz A, Michalski D, Schwarz R, et al. The acquiescence effect in responding to a questionnaire. Psychosocl Med.2007;4, Doc07.
[19] Jukkala A, Deupree JP, Graham S. Knowledge of limited health literacy at an academic health center. J Contin Educ Nurs. 2009;40:298–302.
[20] Devraj R and Gupchup GV. Knowledge of and barriers to health literacy in Illinois. J Am Pharm Assoc (2003) 2012;52: 183–193.
[21] Atcherson SR, Zraick RI and Hadden K. A need for health literacy curriculum: knowledge of health literacy among U.S. audiologists and speech-language pathologists inArkansas. Educ Health (Abingdon) 2013; 26: 85–88.
[22] Ali NK, Ferguson RP, Mitha S, et al. Do medical trainees feel confident communicating with low health literacy patients? J Community Hosp Intern Med Perspect 2014;4. doi:10.3402/jchimp.v4.22893
[23] Cafiero M. Nurse practitioners' knowledge, experience, and intention to use health literacy strategies in clinical practice. J Health Commun. 2013;18(Suppl 1):70–81.
[24] Cormier CM, Kotrlik JW. Health literacy knowledge and experiences of senior baccalaureate nursing students. J Nurs Educ. 2009;48:237–248.
[25] Rozier RG, Horowitz AM, Podschun G. Dentist-patient communication techniques used in the United States: the results of a national survey. J Am Dent Assoc. 2011;142:518–530.
[26] McCarthy DM, Cameron KA, Courtney DM, et al. Self-reported use of communication techniques in the emergency department. J Emerg Med. 2012;43:355–361.
[27] Turner T, Cull WL, Bayldon B, et al. Pediatricians and health literacy: descriptive results from a national survey. Pediatrics. 2009;124(Suppl. 3):299–305.
[28] Price-Haywood EG, Roth KG, Shelby K, et al. Cancer risk communication with low health literacy patients: a continuing medical education program. JGIM. 2010;25(Suppl. 2):126–129.

Tables

Table 1: Socio-demographic characteristics of GP trainees (N=206)

Socio-demographic characteristic	**n**	**%**			
Stage of training					
1st year	79	38.4			
2nd year	66	32.0			
3rd year	48	23.3			
Other	13	6.3			
University where undergraduate studies were completed					
UK university in the study area	100	48.6			
At a UK university outside the study area	96	46.6			
At a EU university	5	2.4			
At a non-EU university	5	2.4			
Gender					
Female	163	79.1			
Male	43	20.9			
Ethnicity					
White	118	57.3			
Asian/Asian British	55	26.7			
Black/African/Caribbean/Black British	9	4.4			
Mixed/multiple ethnic groups	12	5.8			
Other ethnic group	9	4.4			
Prefer not to answer	3	1.4			
Current placement					
GP practice	96	46.6			
Hospital	102	49.5			
Other	8	3.9			
Sectors of postgraduate deanery					
Sector 1	93	45.1			
Sector 2	103	50.0			
Sector 3	10	4.9			

Table 2: Descriptive statistics on knowledge questions

Knowledge question and answer categories (N = 186) correct response is indicated	n (%)	95% CI for percentage correct
Q13: In your opinion, what percentage of English adults have a literacy level equivalent for attainment by a 9-11 year old?		
8%	25 (13.4%)	
15% - correct	92 (49.5%)	41.9% - 56.5%
27%	36 (19.4%)	
31%	33 (17.7%)	
Q14: In your opinion, what percentage of English adults may not be able to understand price labels on pre-packaged food or pay household bills?		
7%	58 (31.2%)	
11%	81 (43.6%)	
24% - correct	34 (18.3%)	12.6% - 23.7%
36%	13 (7.0%)	
Q15: At which level is it recommended to write health information in order to be understood by the majority of the population?		
Year 1 to year 2 (5-7 year old)	5 (2.7%)	
Year 2 to year 4 (7-9 year old)	35 (18.8%)	
Year 4 to year 6 (9-11 year old) - correct	114 (61.3%)	53.8% - 68.3%
GCSE level	32 (17.2%)	
Q16 Which of the following is a "red flag" that a patient may have low health literacy?		
Arriving late for appointments	8 (4.3%)	
Asking a lot of questions	9 (4.8%)	
Distrust in the medical system	28 (15.1%)	
Frequently missed appointments - correct	141 (75.8%)	69.4% - 81.2%
Q17 Which of the following is an example of plain language?		
Take on an empty stomach	10 (5.4%)	
Your test result is negative	4 (2.2%)	
Take one pill by mouth twice a day	23 (12.4%)	
Do not eat cheese, milk and yoghurt - correct	149 (80.1%)	73.7% - 85.5%
Q18 A person with low health literacy is:		
Less likely to participate in preventive health services such as cancer screening.	19 (10.22%)	
More likely to be hospitalised	0 (0.0%)	

More likely to report their health as poor	0 (0.0%)	
All of the above - correct	167 (89.8%)	84.9% - 94.1%
Q19 Which of the following is the preferred method to check patient's understanding?		
Pay attention to nonverbal cues such as a patient nodding in agreement	3 (1.6%)	
Ask if the patient has any questions	3 (1.6%)	
Check if I explained well by having the patient repeat back the information in their own words.- correct	180 (96.7%)	94.1% - 98.9%

Table 3: Responses to the attitude questions and 95% confidence interval for the proportion of positive attitudes

No	Attitudes	N	Strongly disagree n (%)	Disagree n (%)	Neither disagree nor agree n (%)	Agree n (%)	Strongly agree n (%)	Proportion of positive attitudes 95% CI
1	Ensuring that patients understand the health information given to them can improve the quality of health care delivery	194	1 (0.5%)	0 (0.0%)	1 (0.5%)	42 (21.7%)	150 (77.3%)	99% (96.9-99.5)
2	Low health literacy is an issue only for GPs working with people who have low socio-economic status	194	35 (18.0%)	115 (59.3%)	25 (12.9%)	16 (8.3%)	3 (1.6%)	77.3% (71.4-83.3)
3	Low health literacy is an issue only for GPs working with ethnic groups	194	58 29.9%	107 (55.2%)	15 (7.7%)	13 (6.7%)	1 (0.5%)	85.1% (79.7-89.6)
4	Well educated people always have good health literacy skills.	194	18 (9.3)	117 (60.3%)	33 (17.0%)	25 (12.9%)	1 (0.5%)	69.6% (62.5-75.5)
5	It is my responsibility as a GP to facilitate the two way exchange of information in “shared decision making” to the degree desire by the patient and their family	194	0 (0%)	5 (2.6)	11 (5.7%)	104 (53.6%)	74 (38.1%)	91.7% (87.5-95.3)
6	Patients may find health care settings such as hospitals difficult to navigate	192	0 (0.0%)	3 (1.6%)	8 (4.2%)	124 (64.6%)	57 (29.7%)	94.3% (90.6-97.4)
7	Patients who have difficulty reading should simply ask the GP for clarification.	192	1 (0.5%)	56 (29.2%)	63 (32.8%)	64 (33.3%)	8 (4.2%)	29.7% (20.9-35.9)
8	The language used in the context of health care is easy to understand.	192	30 (15.6%)	114 59.4%	37 (19.3%)	9 (4.7%)	2 (1.0%)	75.0% (68.8-81.3)
9	It is the patient’s responsibility to make sure they understand their health care.	192	4 (2.1%)	54 (28.1%)	75 (39.1%)	53 (27.6%)	6 (3.1%)	30.2% (23.8-37.2)
10	It is the patient’s responsibility to find their way to the appointment.	192	1 (0.5%)	23 (12.0%)	64 (33.3%)	97 (50.5%)	7 (3.7%)	12.5% (8.3-17.7)
11	Understanding one’s health care is a basic patient right.	192	0 (0.0%)	2 (1.0%)	13 (6.8%)	116 (60.4%)	61 (31.8%)	92.2% (77.0-95.8)

*Shaded cells indicate a positive attitude

Table 4: Responses to skills questions and 95% confidence interval for the percentage of good or excellent skills

	Skills	N	Number of respondents (%)					Percentage of good or excellent skills (95% CI)
			Very poor	Poor	Average	Good	Excellent	
1	Explain things in plain, non-medical language.	189	0 (0.0%)	1 (0.5%)	34 (18.0%)	131 (69.3%)	23 (12.2%)	81.5% (75.0-87.2)
2	Speak slowly and clearly.	189	0 (0.0%)	2 (1.1%)	26 (13.8%)	131 (69.3%)	30 (15.9%)	85.2% (79.8-89.9)
3	Engage your patients using mentoring and coaching skills.	189	1 (0.5%)	19 (10.1%)	102 (54.0%)	63 (33.3%)	4 (2.1%)	35.4% (28.2-42.0)
4	Select culturally appropriate visual aids for written health materials such as patient leaflets.	189	4 (2.1%)	41 (21.7%)	70 (37.0%)	70 (37.0%)	4 (2.1%)	39.1% (32.5-46.8)
5	Elicit patient's full set of concerns at the outset of the encounter.	189	0 (0.0%)	6 (3.2%)	78 (41.3%)	101 (53.4%)	4 (2.1%)	55.5% (48.4-62.8)
6	Negotiate a mutual agenda at the outset of the encounter.	189	0 (0.0%)	12 (6.4%)	90 (47.6%)	86 (45.5%	1 (0.5%)	46.0% (38.8-53.7)
7	Elicit patient's prior understanding of their health issues in a non-shaming manner.	189	0 (0.0%)	2 (1.1%)	60 (31.8%)	114 (60.3%)	13 (6.9%)	66.9% (60.1-73.4)
8	Confirm understanding by asking patients to repeat information or instructions back to you.	188	0 (0.0%)	20 (10.6%)	72 (38.3%)	87 (46.3%)	9 (4.8%)	51.1% (44.2-58.5)
9	Encourage patients to ask questions through an open approach.	188	0 (0.0%)	1 (0.5%)	26 (13.8%)	133 (70.7%)	28 (14.9%)	85.6% (80.3-90.4)
10	Use a translator or an interpreter.	188	1 (0.5%)	5 (2.7%)	84 (44.7%)	90 (47.9%)	8 (4.3%)	52.2% (45.2-59.0)

11	Select educational materials that are appropriately written for patients.	188	0 (0.0%)	25 (13.3%)	68 (36.2%)	90 (47.9%)	5 (2.7%)	51.6% (43.6-58.0)
12	Explain risk through illustrations.	188	3 (1.6%)	44 (23.4%)	76 (40.4%)	60 (31.9%)	5 (2.7%)	34.6% (27.7-41.5)
13	Draw pictures or make analogies to improve patients' comprehension.	188	1 (0.5%)	27 (14.4%)	62 (33.0%)	88 (46.8%)	10 (5.3%)	52.1% (45.2-59.6)

Table 5: Relationship between socio-demographic characteristics and aggregated measures of knowledge, attitudes and skills

Socio-demographic characteristics	Mean proportion of correct knowledge answers (SD)	P value	Mean proportion of positive attitudes (SD)	P Value	Mean proportion of good or excellent skills (SD)	P value
Gender						
Male	55.8% (25.5%)	0.139*	66.4% (15.8)	0.291*	62.7% (25.4)	0.087*
Female	62.1% (24.7%)		69.4% (16.1)		55.0% (24.7)	
Stage of training						
1st year	62.9% (21.4)	0.060**	68.1% (16.7)	0.973**	57.7% (27.3)	0.941**
2nd year	63.6% (23.8)		69.3% (14.9)		55.2% (24.5)	
3rd year	57.7% (25.9)		69.2% (14.2)		56.3% (22.0)	
Other	45.1% (39.5)		68.2% (25.8)		58.7% (25.3)	
University of completed undergraduate studies						
UK university in the study area	60.9% (25.0)	0.890**	67.4% (16.1)	0.005**	58.1% (25.2)	0.568**
UK university outside the study area	61.1% (24.8)		71.6% (14.9)		55.8% (25.1)	
Non-UK university	55.0% (26.9)		55.5% (18.4)		49.6% (23.4)	
Ethnicity						
White	64.4% (24.3)	0.054**	71.1% (15.5)	0.047**	55.1% (28.4)	0.343**
Asian/Asian British	56.6% (23.0)		64.7% (18.1)		60.9% (23.6)	
Other ethnic groups	55.0% (28.4)		67.8% (16.0)		56.6% (25.0)	
Current placement						
GP practice	59.7% (25.0)		68.7% (17.0)	0.989**	51.4% (23.8)	0.935**

Hospital	61.8% (23.7)	0.826**	68.8% (15.5)		60.6% (26.3)	
Other	62.5% (39.6)		69.7% (11.0)		64.8% (24.5)	
Sector of postgraduate deanery						
Sector 1	58.4% (25.9)	0.184**	67.9% (18.1)	0.777**	60.9% (24.1)	0.034**
Sector 2	63.8% (23.2)		69.4% (14.1)		54.2% (25.3)	
Sector 3	52.9% (30.2)		70.5% (15.2)		40.4% (22.4)	
Familiarity with health literacy concept						
Not at all familiar	65.1% (14.5)	0.241**	70.7% (21.7)	0.896**	39.3% (19.8)	0.001**
Slightly familiar	64.4% (17.3)		68.6% (16.5)		49.7% (22.4)	
Somewhat familiar	68.6% (15.4)		69.0% (13.6)		59.0% (25.4)	
Moderately to extremely familiar	70.4% (14.1)		70.7% (14.3)		67.5% (23.6)	
Health literacy mentioned in the curriculum						
Never	65.7% (15.2)	0.868**	67.3% (18.1)	0.645**	54.5% (21.1)	0.285**
Rarely	67.6% (16.3)		70.5% (14.8)		54.9% (26.1)	
Sometimes	68.2% (16.0)		68.0% (14.0)		63.5% (23.5)	
Often to always	69.8% (13.3)		70.7% (10.9)		59.0% (29.8)	

*T-test; **ANOVA